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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 10/651,134	Applicant(s) GOLLA, PRASAD N.	
	Examiner Wutchung Chu	Art Unit 2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 August 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-31 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 8/28/2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 8/28/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haq et al., hereinafter Haq, (US6885635).

Regarding claim 1, Haq disclose a high capacity router having redundant components **(see col. 1 lines 39-58)** comprising:

- a partitionable data plane **(see col. 2 line 58 packet forwarding engine and figure 1 box 106)** including a plurality of forwarding tables **(see col. 3 line 20 forwarding tables)**, each forwarding table including forwarding information for effectuating a data forwarding process through the router **(see col. 2 lines 63-67)**;

- a partitionable control plane **(see col. 2 line 57 routing engine and figure 1 box 105)** including a plurality of routing tables **(see col. 2 line 59 one or more routing tables)** operating under control of at least one routing protocol process **(see col. 2 line 62)**, the routing tables including information for effectuating routing decisions with respect to the data forwarding process **(see col. 2 lines 63-65)**;

- a control plane update agent module **(see figure 2 box 201 202 REs)** for maintaining a redundant set of routing table information **(see col. 3 line 61 and col. 6 lines 30-31)**, wherein the control plane update agent module is operable to synchronize the routing tables **(see col. 4 lines 23-25)**; and

- a data plane update agent module **(see figure 2 box 205 206 processing components)** operably coupled to the control plane update agent module **(see figure 2 REs and processing components are coupled through redundancy controller and redundancy switch)** for coordinating the forwarding information **(see col. 3 lines 7-9)** with the routing table information **(see col. 2 lines 63-65)**.

Haq does not explicitly teach:

- a control plane update agent module to includes at least one control plane update buffer;

- a data plane update agent module association with a set of data plane update buffers.

However Haq teaches RE **(see col. 6 lines 6 RE routing engine corresponds to control plane update agent module)** pre-stored with preferred state **(see col. 6 lines 5-9)**. And processing components **(see col. 3 line 16 corresponds to data plane update agent module)** may store the forwarding table **(see col. 3 lines 16-19)**. Since both components are capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include update buffer in both control plane update agent module and data plane update agent module, because including update buffer in components, as in Haq, is a method for storing routing/status information.

Regarding claim 2, Haq teaches data forwarding process continues to proceed in an event of failure **(see col. 4 lines 23-27)** based on information stored **(see col. 4 line 36 pre-configured state);**

Haq does not explicitly teach:

- in at least one of the data plane update buffers and the control plane update buffer.

However Haq teaches RE **(see col. 6 lines 6 RE routing engine corresponds to control plane)** pre-stored with preferred state **(see col. 6 lines 5-9)**. And processing components **(see col. 3 line 16 corresponds to data plane)** may store the forwarding table **(see col. 3 lines 16-19)**. Since both components are capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to

time the invention was made to include update buffer in both control plane update agent module and data plane update agent module, because including update buffer in components, as in Haq, is a method for storing routing/status information.

Regarding claim 3, Haq teaches the event of failure comprises a failure associated with the partitionable data plane **(see col. 4 lines 12-27 and figure 4 packet forwarding engine and box 205 and 206 if the active processing component fails, the standby processing component can then immediately assume operation)**.

Regarding claim 4, Haq teaches the event of failure comprises a failure associated with the partitionable control plane **(see col. 6 lines 28-29 and table 1)**.

Regarding claim 5, Haq teaches the partitionable data plane **(see figure 4 packet forwarding engine)** comprises a plurality of data plane nodes **(see figure 4 box 205-207 and 220)**, each having at least one forwarding table **(see col. 3 line 20)**

Haq does not explicitly teach:

- and at least one data plane update buffer.

However Haq teaches processing components **(see col. 3 line 16 corresponds to partitionable data plane)** may store the forwarding table **(see col. 3 lines 16-19)**. Since processing components is capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to

include update buffer in data plane, because including update buffer in component, as in Haq, is a method for storing routing/status information.

Regarding claim 6, Haq teaches the plurality of data plane nodes are organized into a scalable cluster **(see col. 3 lines 44-51)**.

Regarding claim 7, Haq teaches the data plane update agent module **(see figure 4 box processing components)** comprises a plurality of data plane update agents **(see figure 4 box 205 and 206)**, each being associated with a data plane node **(see figure 2 box 225)**.

Regarding claim 8, Haq does not explicitly teach the plurality of data plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies. However, Haq discloses ring topology in figure 4 packet forwarding engine also disclose ring topology; node 205 to 207 to 206 and through 407, 205 and 206 are connected, which forms a ring topology. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include data plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies, because nodes organizing into a distributed network having topologies, as in Haq, is a method for nodes/processing component to communicate to each other to provide system redundancy.

Regarding claim 9, Haq teaches the partitionable control plane **(see figure 2 routing engine box 105)** comprises a plurality of control plane nodes **(see figure 3 box 201, 202)**, each having at least one routing table **(see col. 2 line 59 one or more routing tables)** and

Haq does not explicitly teach:

- at least one control plane update buffer.

However Haq teaches RE **(see col. 6 lines 6 RE routing engine corresponds to control plane)** pre-stored with preferred state **(see col. 6 lines 5-9)**. Since RE is capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include update buffer in control plane, because including update buffer in component, as in Haq, is a method for storing routing/status information.

Regarding claim 10, Haq teaches the plurality of control plane nodes **(see figure 3 box 201, 202, 203, 301, and 302)** are organized into a scalable cluster **(see col. 3 line 66 – col. 4 line 11)**.

Regarding claim 11, Haq teaches the control plane update agent module comprises a plurality of control plane update agents **(see figure 2 box 201, 202)**, each being associated with a control plane node **(see figure 2 box 203redundancy controller)**.

Regarding claim 12, Haq does not explicitly teach the plurality of control plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies. However, Haq discloses ring topology in figure 2 routing engine where nodes are interconnected to each other 201 to 236 to 203 to 231, and back to 201, which forms a ring topology. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include data plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies, because nodes organizing into a distributed network having topologies, as in Haq, is a method for nodes/processing component to communicate to each other to provide system redundancy.

Regarding claim 13, Haq teaches a fault-tolerant routing element having a distributed scalable architecture, comprising:

- means for detecting a fault in an active node disposed in the routing element, the active node for executing a router process **(see col. 6 lines 28-31)**;
- means for effectuating a continuous switchover from the active node to a redundant node responsive to detecting the fault, said redundant node for continuation of the router process **(see col. 6 lines 23-41)**; and

- means for updating routing table information and forwarding table information **(see col. 6 line 31)** associated with the routing element responsive to the continuous switchover operation **(see col. 6 lines 28-31 and scenarios of table 1)**.

Regarding claim 14, Haq teaches the active node comprises a control plane node **(see figure 3 box 201)**.

Regarding claim 15, Haq teaches the active node comprises a data plane node **(see figure 4 box 205 and col. 4 lines 14-15)**.

Regarding claim 16, Haq teaches the active node forms a portion of a topological cluster active comprising a plurality of nodes **(see col. 2 lines 57-67 and figure 2 active RE and redundancy controller and redundancy switch and active processing component and to physical interface slot)**.

Regarding claim 17, Haq teaches a fault-tolerant routing method operable with a network element having a distributed scalable architecture **(see col.1 lines 39-57)**, comprising:

- detecting a fault in an active node disposed in the network element, the active node for executing a router process **(see col. 4 lines 23-27 and col. 6 lines 28-31)**;

- effectuating a continuous switchover from the active node to a redundant node responsive to detecting the fault, the redundant node for continuation of the router process **(see col. 4 lines 23-27 and col. 6 lines 23-41)**; and
- updating routing table information and forwarding table information associated and continuing to execute said router process based upon the updating step **(see col. 2 lines 60-62 and col. 6 line 31)**.

Regarding claim 18, Haq teaches further comprising the operation of determining if the fault comprises a fatal fault involving the network element's control plane **(see col. 2 lines 5-9 and col. 6 lines 28-31)**.

Regarding claim 19, Haq teaches further comprising the operation of determining if the fault comprises a fatal fault involving the network element's data plane **(see col. 4 lines 23-27)**.

Regarding claim 20, Haq teaches the updating of the routing table information **(see col. 2 lines 60-62 where routing information are consolidated between RE and table 1 illustrates scenarios where REs can be active or disable or standby and as failure occurs REs will consolidates information between them)** and the forwarding table information is configurable based upon detecting the fault **(see col. 6 lines 28-31 maintain a recent copy of the forwarding table)**.

Regarding claim 21, Haq teaches a router **(see col. 1 line 40 a router)**, comprising:

- a plurality of control plane nodes **(see figure 3 box 201, 202, 203)** for effectuating routing process functionality based on control updates from peer elements in a communications network **(see col. 2 lines 60-62)**, and a control plane update agent **(see col. 2 lines 60-62 routing engine consolidates routing information)**; and
- a plurality of data plane nodes **(see figure 4 box 205, 206, 207, 220)** for forwarding data based on the routing process functionality **(see col. 2 lines 65-67)**, and a data plane update agent **(see col. 3 lines 11-21)**,
- wherein the data plane update agents **(see figure 4 box 205 206 processing components)** and control plane update agents **(see figure 3 box 201 and 202 RE)** operate to update the forward information databases **(see col. 3 line 8 where RE provide forwarding table to packet forwarding engine and col. 6 lines 28-31 and col. 5 lines 64-66)** and the routing information databases in an asynchronous manner **(see col. 2 lines 60-62 where routing engine consolidates routing information and col. 4 lines 57-67 where RE that is online may wait a predetermined time period before assuming that the other routing engine is not going to come on-line, and col. 5 lines 19-21 after the Res negotiate which is to e the active RE and which is to be the standby RE. Therefore RE waits for a period of time for negotiation between REs for active/standby, the RE then consolidates routing informatoin)**.

Haq does not explicitly teach:

- each control plane node including a routing information database, a control plane update buffer;
- each data plane node including a forwarding information database, a data plane update buffer.

However Haq teaches RE **(see col. 6 lines 6 RE routing engine corresponds to control plane node)** pre-stored with preferred state **(see col. 6 lines 5-9)**. And processing components **(see col. 3 line 16 corresponds to data plane node)** may store the forwarding table **(see col. 3 lines 16-19)**. Since both components are capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include update buffer in both control plane update agent module and data plane update agent module, because including update buffer in components, as in Haq, is a method for storing routing/status information.

Regarding claim 22, Haq teaches the plurality of control plane nodes **(see figure 3 box 201, 202, 203)** and the plurality of data plane nodes **(see figure 4 box 205, 206, 207, and 220)** are organized in a logically disjoint, distributed architecture **(see figure 2 box 105 routing engine corresponds to control plane, and box 106 packet forwarding engine corresponds to data plane)**.

Regarding claim 23, Haq teaches the distributed architecture comprises a scalable cluster **(see col. 3 lines 11-21)**

Haq does not explicitly teach:

- a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies.

However, Haq discloses ring topology in figure 2 routing engine where nodes are interconnected to each other 201 to 236 to 203 to 231, and back to 201, which forms a ring topology, and figure 4 packet forwarding engine also disclose ring topology; node 205 to 207 to 206 and through 407, 205 and 206 are connected, which forms a ring topology. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include data plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies, because nodes organizing into a distributed network having topologies, as in Haq, is a method for nodes/processing component to communicate to each other to provide system redundancy.

Regarding claim 24, Haq teaches the data plane update agents **(see figure 4 box 205 206 processing components)** and control plane update agents **(see figure 3 box 201 and 202 RE)** in an asynchronous manner **(see col. 2 lines 60-62.where**

routing engine consolidates routing information and col. 4 lines 57-67 where RE that is online may wait a predetermined time period before assuming that the other routing engine is not going to come on-line, and col. 5 lines 19-21 after the Res negotiate which is to e the active RE and which is to be the standby RE. Therefore RE waits for a period of time for negotiation between REs for active/standby, the RE then consolidates routing information) to update:

Haq does not explicitly teach:

- the data plane update buffers and the control plane update buffers are operable to be updated

However Haq teaches RE **(see col. 6 lines 6 RE routing engine corresponds to control plane update agents)** pre-stored with preferred state **(see col. 6 lines 5-9)**. And processing components **(see col. 3 line 16 corresponds to data plane update agents)** may store the forwarding table **(see col. 3 lines 16-19)**. Since both components are capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include update buffer in both control plane update agent module and data plane update agent module, because including update buffer in components, as in Haq, is a method for storing routing/status information.

Regarding claim 25, Haq teaches the data plane nodes are operable to continue to forward data upon detecting a fault condition in at least one of the control plane nodes **(see col. 6 lines 28-31)**.

Regarding claim 26, Haq teaches a distributed network, comprising:

- a first network element operable to route data **(see figure 2 routing engine and col. 2 lines 50-56)**; and
- a second network element **(see figure 2 box 106 packet forwarding engine)** coupled to the first network element **(see figure 2 routing engine)**,
- wherein at least one of the first network element and the second network element is comprised of a router **(see figure 2 routing engine and col. 2 lines 50-56)** with decoupled control and data planes **(see col. 2 lines 60-62)**.

Regarding claim 27, Haq teaches the router **(see col. 1 line 40 a router)** comprises:

- a plurality of control plane nodes **(see figure 3 box 201, 202, 203)** for effectuating routing process functionality **(see col. 2 lines 50-56)** based on control updates from peer elements in the distributed network **(see col. 2 lines 60-62)**, and a control plane update agent **(see figure 3 box 201 and 202 Res)**; and

- a plurality of data plane nodes **(see figure 4 box 205, 206, 207, 220)** for forwarding data based on the routing process functionality **(see col. 3 lines 44-54)**, and a data plane update agent **(see figure 4 box 205 and 206 processing components)**,

- wherein the data plane update agents **(see figure 4 box 205 206 processing components)** and control plane update agents **(see figure 3 box 201 and 202 RE)** operate to update the forward information databases **(see col. 3 line 8 where RE provide forwarding table to packet forwarding engine and col. 6 lines 28-31 and col. 5 lines 64-66)** and the routing information databases in an asynchronous manner **(see col. 2 lines 60-62 where routing engine consolidates routing information and col. 4 lines 57-67 where RE that is online may wait a predetermined time period before assuming that the other routing engine is not going to come on-line, and col. 5 lines 19-21 after the Res negotiate which is to e the active RE and which is to be the standby RE. Therefore RE waits for a period of time for negotiation between REs for active/standby, the RE then consolidates routing informatoin)**.

Haq does not explicitly teach:

- each control plane node including a routing information database, a control plane update buffer;

- each data plane node including a forwarding information database, a data plane update buffer.

However Haq teaches RE **(see col. 6 lines 6 RE routing engine corresponds to control plane node)** pre-stored with preferred state **(see col. 6 lines 5-9)**. And processing components **(see col. 3 line 16 corresponds to data plane node)** may store the forwarding table **(see col. 3 lines 16-19)**. Since both components are capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include update buffer in both control plane update agent module and data plane update agent module, because including update buffer in components, as in Haq, is a method for storing routing/status information.

Regarding claim 28, Haq teaches the plurality of control plane nodes **(see figure 3 box 201, 202, 203)** and the plurality of data plane nodes **(see figure 4 box 205, 206, 207, 220)** are organized in a logically disjoint, distributed architecture **(see figure 2 box 105 routing engine and box 106 packet forwarding engine)**.

Regarding claim 29, Haq teaches the distributed architecture comprises a scalable cluster **(see col. 3 lines 11-21)**

Haq does not explicitly teach:

- a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies.

However, Haq discloses ring topology in figure 2 routing engine where nodes are interconnected to each other 201 to 236 to 203 to 231, and back to 201, which forms a ring topology, and figure 4 packet forwarding engine also disclose ring topology; node 205 to 207 to 206 and through 407, 205 and 206 are connected, which forms a ring topology. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include data plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies, because nodes organizing into a distributed network having topologies, as in Haq, is a method for nodes/processing component to communicate to each other to provide system redundancy.

Regarding claim 30, Haq teaches the data plane update agents **(see figure 4 box 205 206 processing components)** and control plane update agents **(see figure 3 box 201 and 202 RE)** in an asynchronous manner **(see col. 2 lines 60-62 where routing engine consolidates routing information and col. 4 lines 57-67 where RE that is online may wait a predetermined time period before assuming that the other routing engine is not going to come on-line, and col. 5 lines 19-21 after the Res negotiate which is to e the active RE and which is to be the standby RE. Therefore RE waits for a period of time for negotiation between REs for active/standby, the RE then consolidates routing information)** to update:

Haq does not explicitly teach:

- the data plane update buffers and the control plane update buffers are operable to be updated

However Haq teaches RE **(see col. 6 lines 6 RE routing engine corresponds to control plane update agents)** pre-stored with preferred state **(see col. 6 lines 5-9)**. And processing components **(see col. 3 line 16 corresponds to data plane update agents)** may store the forwarding table **(see col. 3 lines 16-19)**. Since both components are capable of storing information, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include update buffer in both control plane update agent module and data plane update agent module, because including update buffer in components, as in Haq, is a method for storing routing/status information.

Regarding claim 31, Haq teaches the data plane nodes **(see figure 4 box 205, 206, 207, 220)** are operable to continue to forward data upon detecting a fault condition in at least one of the control plane nodes **(see col. 6 lines 28-31)**.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sankar et al. (US2004/0100969)

Basturk (US2002/0114276)

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wutchung Chu whose telephone number is 571 270 1411. The examiner can normally be reached on Monday - Friday 1000 - 1500EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan D. Orgad can be reached on 571 272 7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WC/
Wutchung Chu

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